

REMARKS/ARGUMENTS

Reconsideration is respectfully requested of the Office Action of August 5, 2008, relating to the above-identified application.

The claims in the case are: Claims 21-34 and 36-41.

Claims 22, 23, 37 and 41 stand withdrawn from further consideration at this time.

Claim 21 has been amended to specify that the alcohol is removed during the hydrolysis reaction. Claim 38 has been amended to correct the typographical error of the word “dip”, thereby removing the basis for the claim objection.

The rejection of Claims 21, 24-33 and 38-39 under 35 U.S.C. § 102(b) as anticipated by the article by *Kim* is traversed and reconsideration is respectfully requested.

The *Kim* article, “Surface Modified SiO₂ Xerogel Films from HMDS/Acetone for Intermetal Dielectrics”, discloses a process for the production of porous SiO₂ xerogel films from a sol-gel process. In the prior known methods, it was very difficult to avoid shrinkage by capillary forces during the drying of the film. As a result, cracking and collapse of the three-dimensional structure formed in the aging process could occur. The solution proposed by *Kim* is the use of HMDS as a surface modifier in the process combined with acetone as a solvent without solvent exchange for the preparation of SiO₂ xerogel thin films.

The SiO₂ sol shown as being used by *Kim* was prepared using the known two-step acid/base catalyzed procedure of hydrolysis and condensation with tetraethoxysilane (TEOS) as a precursor and acetone as a solvent. The HMDS was used as a modifying agent.

The resulting sol is reported as being transparent. The gelation step was accomplished in seven hours at room temperature. Following that, in a stable range of viscosity the sol was spun

on a p-type Si (100) substrate. The wet gel films which are spun on the substrate are then aged in acetone for 24 hours at room temperature. As an essential step in the *Kim* process, the wet-gel films were modified with HMDS in acetone without a solvent exchange step.

In applicants' process, the steps recited in Claim 21 define the process wherein the previously optional step of removing alcohol has now been made mandatory. It is to be noted that the *Kim* article does not disclose or suggest the step of removing alcohol that is formed during the hydrolysis reaction and thereby forming a sol. In this way, applicants have no need to modify the wet-gel with HMDS.

Accordingly, applicants' respectfully submit that *Kim* does not anticipate the subject matter of Claim 21 and those claims which are dependent on Claim 21. Withdrawal of the rejection is therefore requested.

The rejection of Claims 21, 24, 25, 27, 31-33, 38 and 40 under 35 U.S.C. § 102(b) as anticipated by the patent of *Hata, et al.*, US 4,816,049, is traversed and reconsideration is respectfully requested.

Hata, et al., relates to a process for surface treating a laser glass used in laser systems. The purpose of the treatment is for increasing thermal shock resistance and water resistance on the surface of the laser glass. To accomplish those purposes, *Hata, et al.*, discloses that a specific sol solution is obtained by hydrolysis and partial condensation of a mixture containing a metal alcoholate on the glass surface and then heating the coated glass to form a glossy coating. Prior to forming the glossy coating, the glass surface is treated with an aqueous alkali solution and with an aqueous solution of phosphoric acid in sequence. The coating and the heating steps may be repeated to form a double or multi-layer of the same or different kinds of glossy coatings.

In col. 3, lines 48-49, *Hata, et al.*, shows organic solvents including alcohols, like methanol, ethanol, propanol, isopropanol, butanol and the like. Acetone can also be used together with ether, benzene, acetylacetone and the like. The examples of *Hata, et al.*, use ethanol as the organic solvent.

It is important to note that *Hata, et al.*, does not describe that the hydrolysis of the alkoxide solution is done in an aprotic solvent followed by the removal of the alcohol. Applicants' claims specify that the alcohol formed during the hydrolysis reaction is removed and that a sol is formed. This step is not shown in *Hata, et al.*, and therefore, *Hata* fails to anticipate the claimed invention.

Withdrawal of the rejection is therefore requested.

The rejection of Claim 34 under 35 U.S.C. § 103(a) as unpatentable over *Kim* is traversed and reconsideration is respectfully requested.

The article by *Kim* has already been discussed above and it has been pointed out that *Kim* does not disclose the removal of the alcohol which is formed during the hydrolysis reaction. Accordingly, *Kim* fails to disclose a step which is important to applicants' invention and, therefore, the rejection based on *Kim* does not establish *prima facie* obviousness of the claimed invention. In the absence of applicants' disclosure, there is nothing in *Kim* that would lead a person skilled in the art to the claimed invention.

The rejection of Claims 35 and 36 under 35 U.S.C. § 103(a) as unpatentable in view of *Kim* further in view of *Minami*, US published application 2002/0160153, is traversed and reconsideration is respectfully requested.

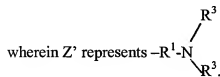
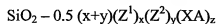
The fact that *Kim*'s article does not disclose the step of removing the alcohol which is formed during the hydrolysis reaction has already been pointed out.

The *Minami* published application does not provide this missing feature. *Minami* describes a method for producing an article having a predetermined surface pattern. The steps carried out by *Minami* involve disposing a sol-gel material between a patterning die and a substrate in the form of a film and heating to coat the surface of the substrate with a gel film having a surface pattern. The surface pattern is the inverse of the surface pattern of the patterning die. The sol-gel material contains at least one compound selected from the silanes having the formula R^1SiX and at least one compound selected from the group consisting of the silane compound R^2SiY_3 wherein R^2 is an aryl group or a substituted aryl group, Y is an alkoxy group or a halogen atom. According to paragraph [0034] of *Minami*, dilution solvents can be used including alcohols. However, *Minami* does not describe the removal of the ethanol which is produced by the hydrolyzation of the alkoxides.

Accordingly, applicants respectfully submit there is no suggestion in *Minami* that the process described by *Kim* could be improved in any way by the modifications shown by *Minami*. Applicants respectfully submit that the combination of *Kim* and *Minami* does not create *prima facie* obviousness of the claimed invention and, therefore, the rejection should be withdrawn.

The rejection of Claim 40 under 35 U.S.C. § 103(a) as unpatentable over *Kim* taken with *Ravaine, et al.*, US 4,923,950, is traversed and reconsideration is respectfully requested. The article by *Kim* has already been discussed and it was pointed out that *Kim* fails to teach the step of removing the alcohol which is formed during the hydrolysis reaction.

Ravaine, US 4,923,950, describes a composition comprising a silica derivative modified by organic groups, said derivatives being an amorphous solid having the formula:



This composition is prepared by subjecting a mixture of $\text{Si}(\text{O-Alk})_4$, $\text{Si}(\text{O-Alk})_3\text{Z}^1$ and $\text{Si}(\text{O-Alk})_3\text{Z}^2$ to a hydrolysis and polycondensation reaction and wherein the water of said solution is of a quantity sufficient to hydrolyze the alkoxy silane groups of the said compounds of the mixture into corresponding silano groups and after completion of the reaction, heating the resulting gel to a constant weight at a temperature greater than 100°C but lower than the decomposition temperature of the material obtained.

Ravaine does not describe the hydrolyzation of the alkoxide solution in an aprotic solvent, followed by the removal of the alcohol by product.

It is therefore apparent that neither of the cited references discloses or teaches the importance of the alcohol removal step. Consequently, the combination of references fails to establish *prima facie* obviousness of the claimed subject matter.

Withdrawal of the rejection is requested.

The rejection of Claims 26, 28, 29, 30 and 34 under 35 U.S.C. § 103(a) as unpatentable over the *Hata* published application is traversed and reconsideration is respectfully requested.

Hata has been discussed above in detail and the remarks apply here as well. The rejection does not create *prima facie* obviousness for reasons given above and, therefore, should be withdrawn.

The rejection of Claim 39 under 35 U.S.C. § 103(a) in view of *Hata* taken with *Teranishi*, US 5,693,365, is traversed and reconsideration is respectfully requested.

Teranishi describes a method for forming a water-repellent film, comprising the steps of:
coating a coating solution for the purpose of forming a water repellent film on the surface of a transparent substrate,

then drying the coated surface and

baking the coated substrate to thereby form a water-repellent film thereon.

The solution used by the reference contains ceramics having an SiO₂ content of at least 50% and in which non-metallic atoms have been partly substituted by fluoroalkyl groups.

The coating solution can containing tetraethoxysilane and fluoroalkylsilane.

The hydrolyzation is done in a mixture of ethanol and water without the removal of the ethanol produced by the hydrolyzation. Furthermore, the invention does not use fluoroalkylsilane.

It is therefore apparent that neither of the cited references discloses or teaches the importance of the alcohol removal step. Consequently, the combination of references fails to establish *prima facie* obviousness of the claimed subject matter.

Withdrawal of the rejection is requested.

In summary, none of the references, either singly or in any combination create *prima facie* obviousness of the claimed subject matter and, therefore, all the rejections should be withdrawn and the claims allowed.

Favorable action at the Examiner's earliest convenience is respectfully requested.

Respectfully submitted,

SMITH, GAMBRELL & RUSSELL, LLP

By: 
Robert G. Weilacher, Reg. No. 20,531

Dated: November 5, 2008
Suite 3100, Promenade II
1230 Peachtree Street, N.E.
Atlanta, Georgia 30309-3592
Telephone: (404): 815-3593
Facsimile: (404): 685-6893